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April 12, 2002

Mr. Robert Pernell and Mr. Arthur Rosenfeld
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Dear Commissioners Pernell and Rosenfeld:

Re: Docket No. 02-BSTD-1

Comments to: CONSIDERATION OF POTENTIAL AMENDMENTS TO BUILDING ENERGY EFFICIENCY STANDARDS

CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 6

Pacific Gas and Electric (PG&E) hereby submits the following comments on the *Consideration of Potential Amendments to Building Energy Efficiency Standards*.

PG&E has long supported the California Building Standards as a means of saving energy for California ratepayers. PG&E through its energy efficiency programs has for more than 10 years been an active participant in the push for air tight forced air duct systems in both residential and non-residential buildings. PG&E's experience indicates that duct systems fail for reasons including selection of wrong materials, poor performance of materials, and improper use of materials. It is also our experience that the use of mastic is a robust approach to solving these problems. In consideration of industry concerns regarding current standards for tight ducts, PG&E strongly urges the CEC to maintain the final language as adopted during the AB 970 rulemaking, requiring the use of mastic.

If the CEC decides to adopt a time limited exception to the existing restriction on the use of cloth back duct tape, PG&E support is based on modifying the proposed "Express Terms" as suggested in the text to follow. The exception, as modified, will require those who want to use cloth back duct tape to use properly labeled tape, with draw bands only on beaded round to round connections in the duct system.

In Section 150 (m) 2., PG&E recommends that "D." be deleted in its entirety. It is a copy of the "D." in Section 150 (m) 3. and is not applicable to factory-fabricated duct systems. As a practical matter, these systems are not using cloth back tape. Also, Underwriters Laboratories has a special program that purports to regulate the design and fabrication, in a factory setting, of whole systems whose performance equals or exceeds the performance of field fabricated duct systems. When these systems are taken into the field all connections made in the field become subject to Section 150 (m) 3. Field Installed Ducts.

In Section 150 (m) 3., add a new section "D. Flexible Nonmetallic Duct Connections". When PG&E staff reviewed the proposed Express Terms language it became apparent that this new section was needed to cover the generally encountered situation of flexible duct connections. If adding this is outside the allowed scope of these proceedings, then the items in this new section should be included in the "Exception" to the existing section "D." The first two items in the new section "D." were in the proposed exception language but apply more generally. The third and fourth items are needed to deal with problems that occur when the incorrect types of sheet metal fittings are used. Fittings as light as 30 gage have been encountered that crimp under the pressure of the draw bands and are subject to being easily damaged. Fittings that are too short do not allow adequate room for correct taping and banding to be performed. The last four items are present to give clear installation directions for proper installation that is generally lacking in the literature available to technicians and building inspectors.

The existing section "D." is to be reordered to become "E." to allow for the new section "D." and is truncated after the word "tapes." It is strongly recommended that the language allowing the use of cloth back tape "in combination" be eliminated because of the confusion that it has created since the adoption of the present version of the standards. In addition, the Express Terms that will be adopted by these proceeds will address the problems that the original "in combination" language began to address.

The recommendations for changes to the proposed "Exception" language are made for clarity, accuracy and to insure the longevity of the joint being made. Since there are a great many types of ducts and duct materials and configurations in use, additional clarification is recommended. In addition, it is critical that fittings have beads, that is, a rolled-in rigid, in a location between where the draw band will be placed and the end of the fitting. This keeps the draw band from sliding off the fitting. The application of the tape in a staggered wrap pattern allows the tape to adhere to itself, which it does best and to the duct or the fitting.

Sincerely,

Duane Larson
Manager
Residential Energy Management

EXPRESS TERMS

TITLE 24, PART 6

SUBCHAPTER 7

LOW-RISE RESIDENTIAL BUILDINGS – MANDATORY FEATURES

SECTION 150 – MANDATORY FEATURES AND DEVICES

(m) Air-Distribution System Ducts, Plenums, and Fans.

2. **Factory-fabricated duct systems.**

3. Field-fabricated duct systems

D. Flexible Nonmetallic Duct Connections

Tapes shall be labeled 181B-FX and a minimum of two inches wide, and mastics shall be labeled 181B-M.

ii All surfaces to which sealants are applied shall be cleaned in accordance with sealant manufacturer's instructions.

iii. All sheet metal fittings shall be round, all diameters shall be beaded, fittings up to 14 inches in diameter shall be 26 gage or heavier, and fittings greater than 14 inches in diameter shall be 24 gage or heavier.

iv. Sleeve fittings for splicing shall be at least 6 inches long, and start collars shall be at least 4 inches long.

v. The flexible core shall be pulled at least one inch beyond the bead and secured with a drawband which: (a) is placed behind the bead, and (b) captures the entire circumference of the flexible core.

vi. **Connections sealed with mastic.** A layer of mastic at least two inches wide shall be placed between the metal fitting and the flexible core.

vii. **Connections sealed with tape.** The flexible core shall be sealed to the fitting with at least two staggered wraps of tape, which overlap 50-75% of their width. The tape shall be centered over the end of the core so that it spans equally over both surfaces. The drawband may be installed directly over the flexible core or over the tape.

viii. At each connection, the insulation and moisture barrier jacket shall be pulled over the core; and the jacket shall be sealed with at least two wraps of 181B-FX tape and/or a drawband. At each splice, the jackets shall be: (a) overlapped at least two inches, and (b) sealed with at least two staggered wraps of tape and/or a drawband

E. Joints and Seams of duct systems shall not be sealed with cloth back rubber duct tapes.

Exception to 150(m)3.E.

Until January 1, 2004, cloth back rubber adhesive duct tape may be used to seal the attachment of nonmetallic flex duct cores to beaded round sheet metal fittings and to seal the outer moisture barrier jacket of flex duct connections, only when the following conditions are met:

a. the cloth back rubber adhesive duct tape meets all requirements of UL 181B and is labeled UL 181 B-FX;
b. the mating surfaces of the sheet metal fitting and flex duct core and flex duct outer moisture barrier jacket are cleaned to be free of dirt, oil and grease;
c. the connection of the flex duct core and the fitting is sealed with at least two continuous and staggered wraps of tape, and a drawband is installed over the tape and located in accordance with section 3.D.v.;
d. the splice of two flex duct cores is sealed by butting the cores together on a metal sleeve, and taping the cores together with at least two continuous and staggered wraps of tape, and two drawbands are installed, one over the tape on each core-to-sleeve connection; and
e. each core-to-fitting connection is: (a) sealed with two or more continuous, staggered wraps of tape which span at least two inches of each mating surface, and (b) secured with a drawband installed over the tape.
f. the outer moisture barrier jacket of the flex duct is sealed with at least three continuous wraps of tape and a drawband is installed over the center of the wraps of tape.

Cloth back rubber adhesive duct tape shall not be used to seal any other joints or seams of duct systems and their components.